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Research poster: GIS and Remote Sensing Core Lab for facilitating interdisciplinary research in climate change

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GIS and Remote Sensing Core Lab for Facilitating Interdisciplinary Research in Climate Change

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Introduction

Geographic Information Systems (GIS) and Remote Sensing (GIS/RS) Core Lab is established to provide GIS and Remote Sensing support to the University of Nevada, Las Vegas (UNLV) and the region. GIS/RS Core Lab is poised to advance interdisciplinary research and facilitate geographical and remote sensing data handling at UNLV and in the region. This poster describes the labs mission, resources, facilities, and projects. The lab is located in the Science and Engineering Building (Fig. 1 & 2) at UNLV campus. It is managed by a lab director and student assistants; and has several faculty advisors from across the departments on the campus.



Fig. 1: Science and Engineering Building



Fig. 2: (a) South and (b) North instruction areas of the lab.

Mission and Vision

Mission: The mission of the GIS/RS core lab is to provide unique GIS and RS capabilities, technical support, and training to advance interdisciplinary research and productivity at UNLV and in the region.

Vision: We envision the functions of the GIS/RS core lab as follows:

- GIS/RS Core Lab is a research-centered lab that would continue to propose and conduct synergistic research activities for UNLV and the region. The lab would provide support on research proposals in need of handling, processing, and visualizing GIS and remote sensing data.
- GIS/RS Core Lab would provide high-end processing capability to acquire, process, and visualize geographical information. These capabilities include industry standard hardware and software for both lab- and field-work.
- GIS/RS Core Lab would educate community users, faculty, staff, and students about the advances in GIS and remote sensing and train them in new technologies through short courses, seminars, and online distant learning resources.

GIS/RS Core Lab Resources

The lab houses several hardware and software resources for office and field work. Moreover, the lab has printing, scanning, and laminating equipment for large form documents. Following is the summary inventory lab hardware.

Lab Computers:

- 17 General purpose research workstations with GIS software (Fig. 2).
- 4 High-end processing workstations with GIS and image processing capabilities.
- 1 Storage computer with large disk space for archives



Fig. 3: Printing and scanning equipment including large document (a) printer, (b) laminator, and (c) scanner.

Printing/Scanning (Fig. 3):

The large form printer is used by students and faculty for plotting posters for conference and workshop presentations. Lab also has a laminator used for laminating maps for fieldwork. A large form document scanner is available for digitizing large maps and images.

Technical Support

- The lab personnel provide expert support to the GIS and remote sensing needs of students and faculty. This ranges from providing solutions to everyday problems (e.g., Which GIS tool to use?, How to port a certain data format?, etc.) to providing long-term support on research proposals and projects.
- The lab provides support to read and process remote sensing data in several formats from spaceborne sensors. Moreover, capabilities for geometrical and radiometric correction of the data are also provided.
- The lab provides solutions to handling and processing geographical data. This includes GPS devices, creation of geodatabases, populating geodatabases using archived and field data, and porting of geodatabases to usable forms and maps.

Audio/Visual Instruction Equipment:

The lab has two instructor stations available on two ends of the room (Fig 2). It can be used as a single class room or can be partitioned into two separate instruction areas. Both instructor stations have separate projectors, projector screens, and other presentation-specific hardware support (overhead projector, DVD player, microphone, etc.).

Field Equipment (Fig. 4):

Mobile hardware provided by the lab is used by faculty and students to meet their fieldwork needs. Field laptops are maintained with necessary GIS software for visualizing and processing geographical data in the field. GPS units are being used in various projects to map high accuracy geographical data.



Fig. 4: Portable data recording equipment including (a) Toughbook, (b) High precision Trimble GPS units, and (c) Garmin GPS units

Data Resources:

GIS-RS lab continues to archive and maintain geographical and remote sensing data; and provide technical support to faculty and students of UNLV. Some example data archives maintained are

- Digital Elevation Model (DEM) data of North America;
- Topographical, transportation, political, and hydrological GIS maps of USA;
- Tropical Rainfall Measuring Mission Precipitation Radar data for the globe;
- Vegetation and landcover GIS data of North America;
- Scatterometer and radiometer images of North America from several spaceborne sensors;
- Quickbird data of Clark county; and
- Some MODIS images of parts of southwestern US.

The lab also provides access to ESRI data portals of US topographical maps and high resolution satellite imagery.

Summary

GIS and Remote Sensing Core lab has been established to provide GIS and remote sensing research and support at UNLV and in the region. The lab meets this goal by housing and providing industry standard hardware and software resources. Moreover, the lab provides technical support to faculty and students in need of handling, processing, and visualizing GIS and remote sensing data. The lab continues to reach out to UNLV research community and meanwhile, build capacity for improved quality of service and impact on the GIS and remote sensing activities at UNLV and in the region.

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